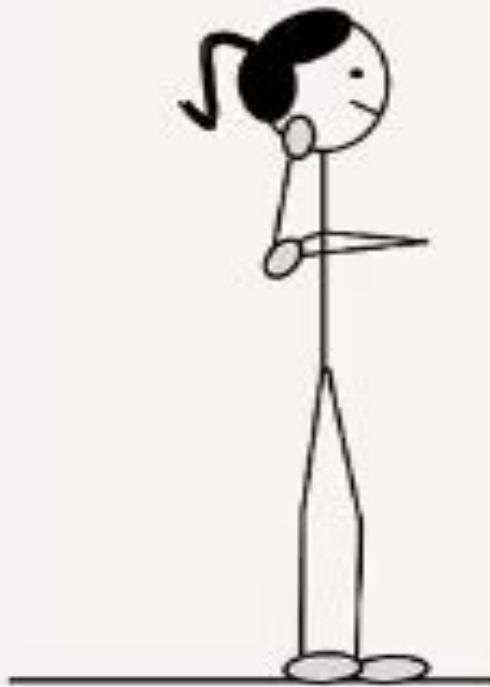




# How to increase Citation Rate?

Faleh Sawair BDS, FDS RCS (England), PhD  
Director/Accreditation and Quality Assurance Center  
Professor of Oral Pathology  
The University of Jordan

Leadership roles Patents Curriculum development  
Grants Collaboration Media appearances  
Presentations Mentoring Teaching Citations  
Publications Awards h-index  
Community partnerships  
and more . . .





*"It's publish or perish, and he hasn't published."*

*"Get cited or  
perish"*

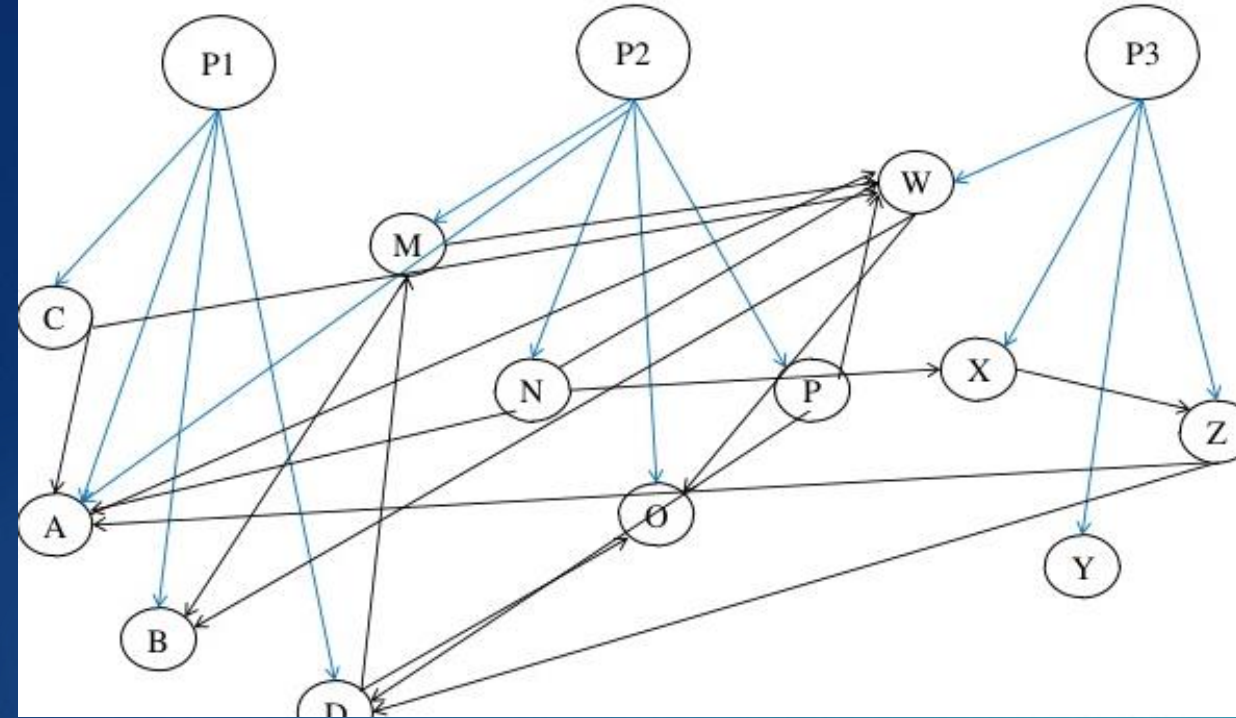


# Citation

- ❑ When researchers refers to another author's works in their own publication work, they cite it.
- ❑ A quality indicator.
- ❑ Links.



### Citation example(I)



### Citation example(II)

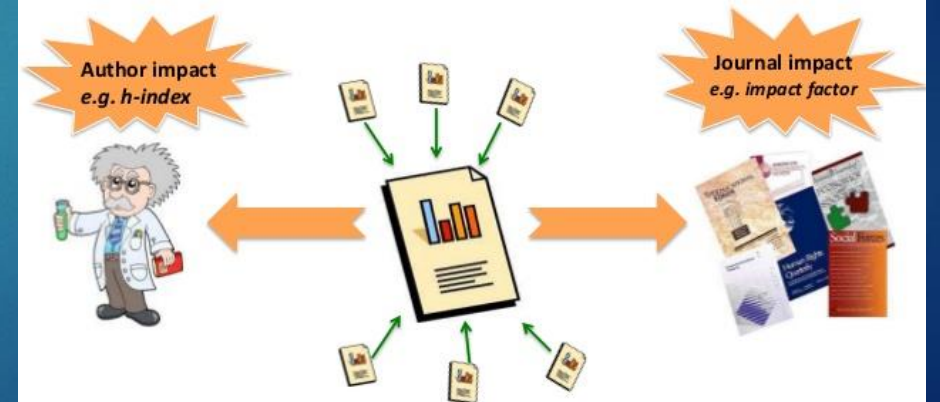
Author	Paper	Paper cited by	Paper citation value	Author citation value
P1	A	N,Z	2	6
	B	M,W	2	
	C		0	
	D	P,Z	2	
P2	A	N,Z	2	5
	M	D	1	
	N		0	
	O	D,W	2	
	P		0	
P3	W	M,N,A,C,P	5	6
	X	N	1	
	Y		0	
	Z		0	

# Citation Analysis

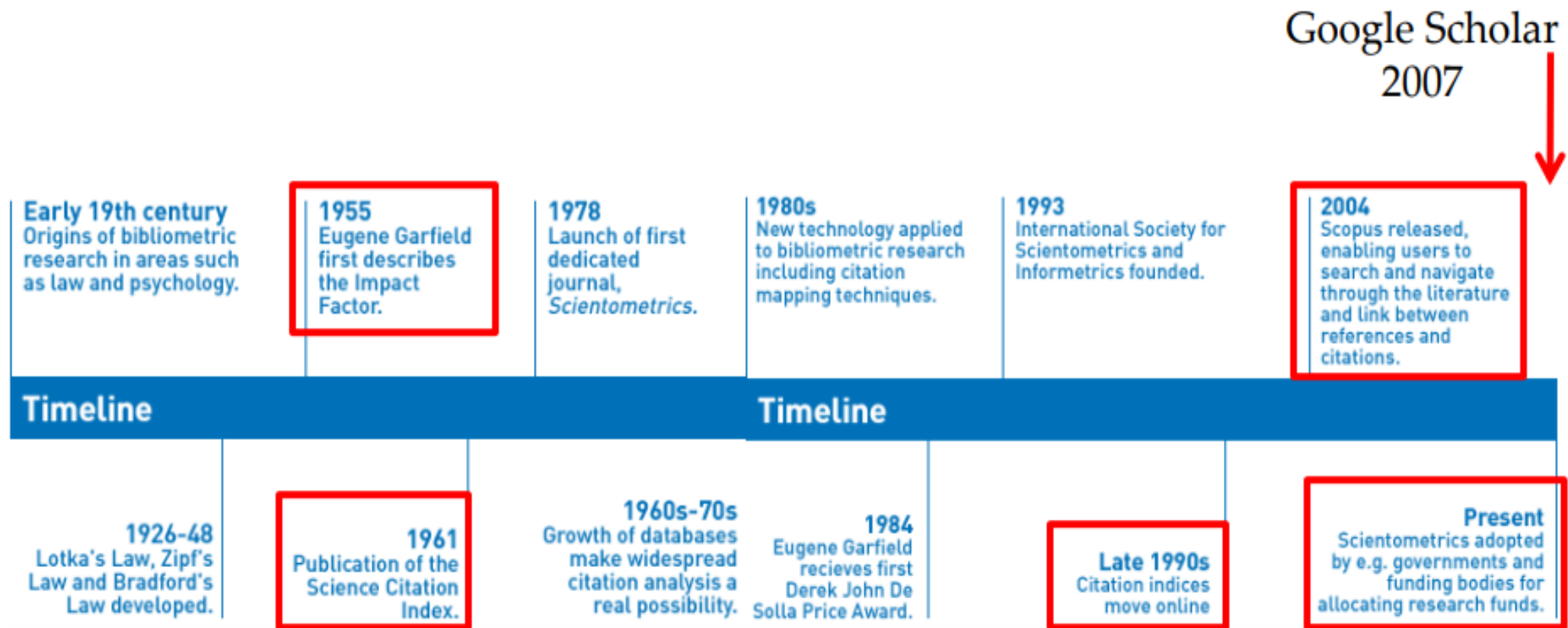
7

- ▶ Citation analysis provides the ability to track the work of authors, the influence of papers and the flow of research ideas.
- ▶ A citation count refers to the number of times one paper has been cited or referenced in the work of another

## It All Starts With A Citation ...



## Bibliometrics Time Line



The first such algorithm for automated citation extraction and indexing was by CiteSeer. 2001

# Why would you want to know if your work is cited?

- Exciting to see how others use your research.
- Get ego boost because someone has read your paper.
- Hiring, promotion, tenure, yearly performance appraisals.
- Know who is building on your work; look for future collaborators.
- Generate new ideas or reframe existing.
- To enhance bids for funding.

# Why would you want to know if your work is cited?

10

- ▶ Demonstrate personal, group and institutional research performance.
- ▶ Rankings.
- ▶ Applying for fellowships from prestigious academic bodies.
- ▶ Quantify return on research investment.
- ▶ Determine if research findings were extended (different human population....)
- ▶ Demonstrate that research findings are resulting in meaningful health outcomes.

# Bibliometric indicators

11

- ▶ Total number of published papers.
- ▶ Number of Publications in Top-ranked Journals.
- ▶ Number of papers published in a certain period of time.
- ▶ Total number of citations.
- ▶ Citations per paper
- ▶ Papers with more than a certain amount of cites.
- ▶ Median impact factor of the journals where the papers are published.

# H-index (2005)

12

- ▶ The h index is a metric for evaluating the cumulative impact of an author's scholarly output and performance.
- ▶ H-index of 10 means 10 papers with at least 10 citations each

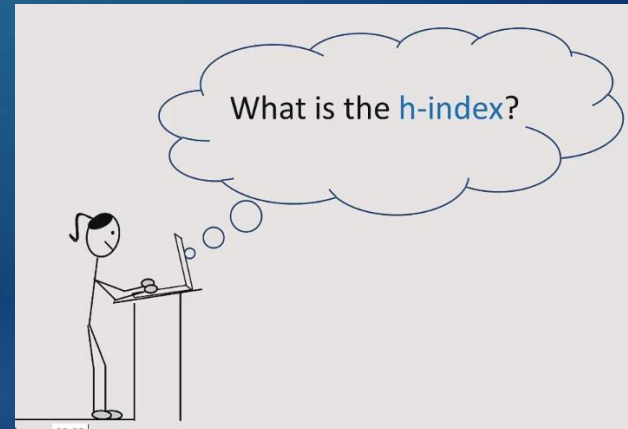
Paper	Citations	
1	130	✓
2	85	✓
3	24	✓
4	15	✓
→ 5	9	✓
6	4	
7	1	

YES

# H-index

13

- ▶ It considers both productivity and impact.
- ▶ It is not influenced by very successful articles (criticism).
- ▶ Discounts the value of papers that are not influential.
- ▶ Simpler and easier to understand.
- ▶ Difficult to increase.
- ▶ Several resources automatically calculate the  $h$  index.



# H-index

## Criticism:

- ▶ Age of the scholar
- ▶ Assess the entire output by an author; not intended for a specific time frame.
- ▶ Time since publication of individual articles,
- ▶ The quality and impact of the journals in which they were published,
- ▶ The number of authors, whether the scholar in question was the first author,
- ▶ Whether the citations viewed the article positively or negatively,
- ▶ Can not indicate periods of inactivity.
- ▶ Difficult to compare authors of different disciplines.
- ▶ Self-citations or complimentary citations among colleagues can skew the h index.

# H-index

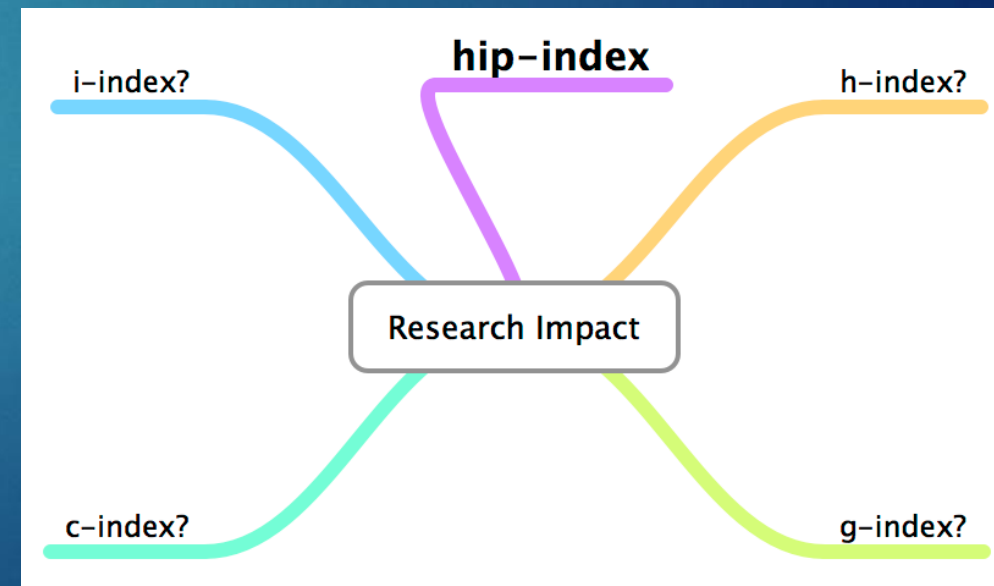
## Criticism:

- ▶ The  $h$  index will vary among resources depending on the publication data that is included in the calculation of the index.
- ▶ A: 1000, 550, 400, 97, 6, 5    H-index = 5
- ▶ B: 15, 10, 8, 7, 6, 5    H-index = 5

# Other indices

16

- ▶ Since Hirsch introduced the  $h$  index in 2005, this measure of academic impact has garnered widespread interest as well as proposals for other indices such as the  $g$  index,  $h$  (2) index,  $m$  index,  $r$  index, to name a few.



# The m index

17

- ▶ The m value is a correction of the h index for time ( $m = h/y$ ).
- ▶ m is an “indicator of the successfulness of a scientist” and can be used to **compare scientists of different seniority**. The m value can be seen as an indicator for “scientific quality” with the advantage (as compared to the h index) that the **m value is corrected for career length**.
- ▶ How Calculated:  $m \text{ value} = h \text{ index (h)} / \text{number of years since first paper (n)}$ .

## g-index for Professor X

The top  $g$  articles received (altogether) at least  $g$  squared citations.

Document no. (g)	Citation count	Square of g	Total no. of citations
Document 1	50 cites	1	50
Document 2	18 cites	4	$50+18 = 68$
Document 3	11 cites	9	$68+11 = 79$
Document 4	7 cites	16	$79+7 = 86$
Document 5	4 cites	25	$86+4 = 90$
Document 6	3 cites	36	$90+3 = 93$
Document 7	1 cites	49	$93+1=94$
Document 8	1 cites	64	$94+1=95$
Document 9	1 cites	81	$95+1=96$
Document 10	1 cites	100	$96+1=97$

# i10-index

19

- ▶ The number of papers you have published which have had 10 or more citations.

# A and M-indices

20

A- index	M-index
A-index – e.g. 35 The <b>average</b> number of citations of publications in the h-index of 25 is 35	M-index – e.g. The <b>median</b> number of citations received by papers in the h-index of 25 is 38

Paper	Citations	
1	130	✓
2	85	✓
3	24	✓
4	15	✓
→ 5	9	✓
6	4	
7	1	

YES

# What are the Ranges?

21

- ▶ h index of 20 after 20 years of scientific activity, characterizes a **successful scientist**
- ▶ h index of 40 after 20 years of scientific activity, characterizes **outstanding scientists**, likely to be found only at the top universities or major research laboratories.
- ▶ h index of 60 after 20 years, or 90 after 30 years, characterizes **truly unique individuals**.

# How to find your citation counts?

## Choosing an appropriate database

- ▶ Many databases: three major
- ▶ Databases are extensive but not comprehensive.
- ▶ Limitations:
  - ▶ Non-unique and inconsistent author naming
  - ▶ Language bias
  - ▶ Discipline-specific biases.

**Problems with Citation Analysis Tools**

- One author has multiple Author IDs in Scopus

1.	<input type="checkbox"/> McKay, G. McKay, G. McKay, G.	<a href="#">Details</a> 40 <a href="#">Show Last Title</a>	Environmental Science; Chemical Engineering; Materials Science; ...	Hong Kong University of Science and Technology	Hong Kong	China
2.	<input type="checkbox"/> McKay, G. McKay, G.	<a href="#">Details</a> 11 <a href="#">Show Last Title</a>	Environmental Science; Earth and Planetary Science; Engineering; ...	Hong Kong University of Science and Technology	Hong Kong	China
3.	<input type="checkbox"/> McKay, G. McKay, G.	<a href="#">Details</a> 2 <a href="#">Show Last Title</a>	Environmental Science; Chemical Engineering	Hong Kong University of Science and Technology	Hong Kong	China
4.	<input type="checkbox"/> McKay, Gordon C. McKay, G. McKay, G. C. McKay, G.	<a href="#">Details</a> 225 <a href="#">Show Last Title</a>	Pharmacology, Toxicology and Pharmaceutics;	Hong Kong University of Science and Technology	Hong Kong	China

The h-index depends on where you get the publication and citation data.

Scopus

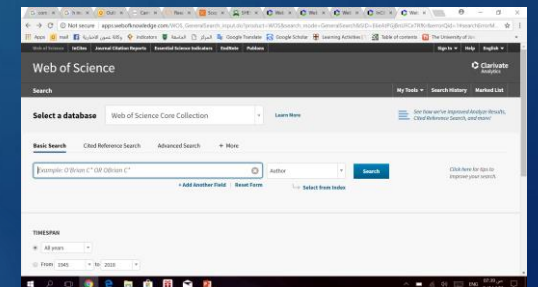
WEB OF SCIENCE™

Google  
Scholar

# Web of Science

23

- ▶ One of the leading databases of scholarly research articles, covering a broad range of subject areas.
- ▶ WS allows for generation of the h index for publications and citations from 1970 to current using the "Create Citation Report" feature.
- ▶ [http://apps.webofknowledge.com/UA\\_GeneralSearch\\_input.do?product=UA&search\\_mode=GeneralSearch&SID=Q1oi3KWiAXauPiMKcGX&preferencesSaved=](http://apps.webofknowledge.com/UA_GeneralSearch_input.do?product=UA&search_mode=GeneralSearch&SID=Q1oi3KWiAXauPiMKcGX&preferencesSaved=)



# Google Scholar

24

- ▶ Google Scholar is the 'academic' version of the popular Google search engine.
- ▶ Scholarly literature from:
  - ▶ peer-reviewed papers
  - ▶ theses,
  - ▶ books,
  - ▶ abstracts,
  - ▶ court opinions,
  - ▶ patents
- ▶ From:
  - ▶ academic publishers,
  - ▶ professional societies,
  - ▶ online repositories,
  - ▶ universities and other web sites.
- ▶ Instead of archiving journals, it archives individual papers instead, which are identified and indexed automatically.
- ▶ Quick and easy to use, and it produces a lot of results.
- ▶ Provides the h index for authors who have created a profile.
  - ▶ <https://scholar.google.com/>



# Google Scholar

25

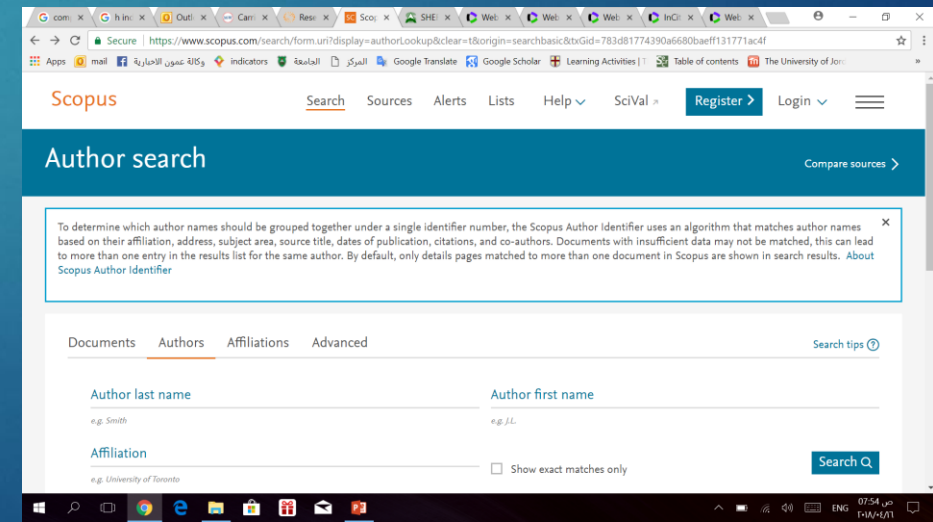
## Criticism

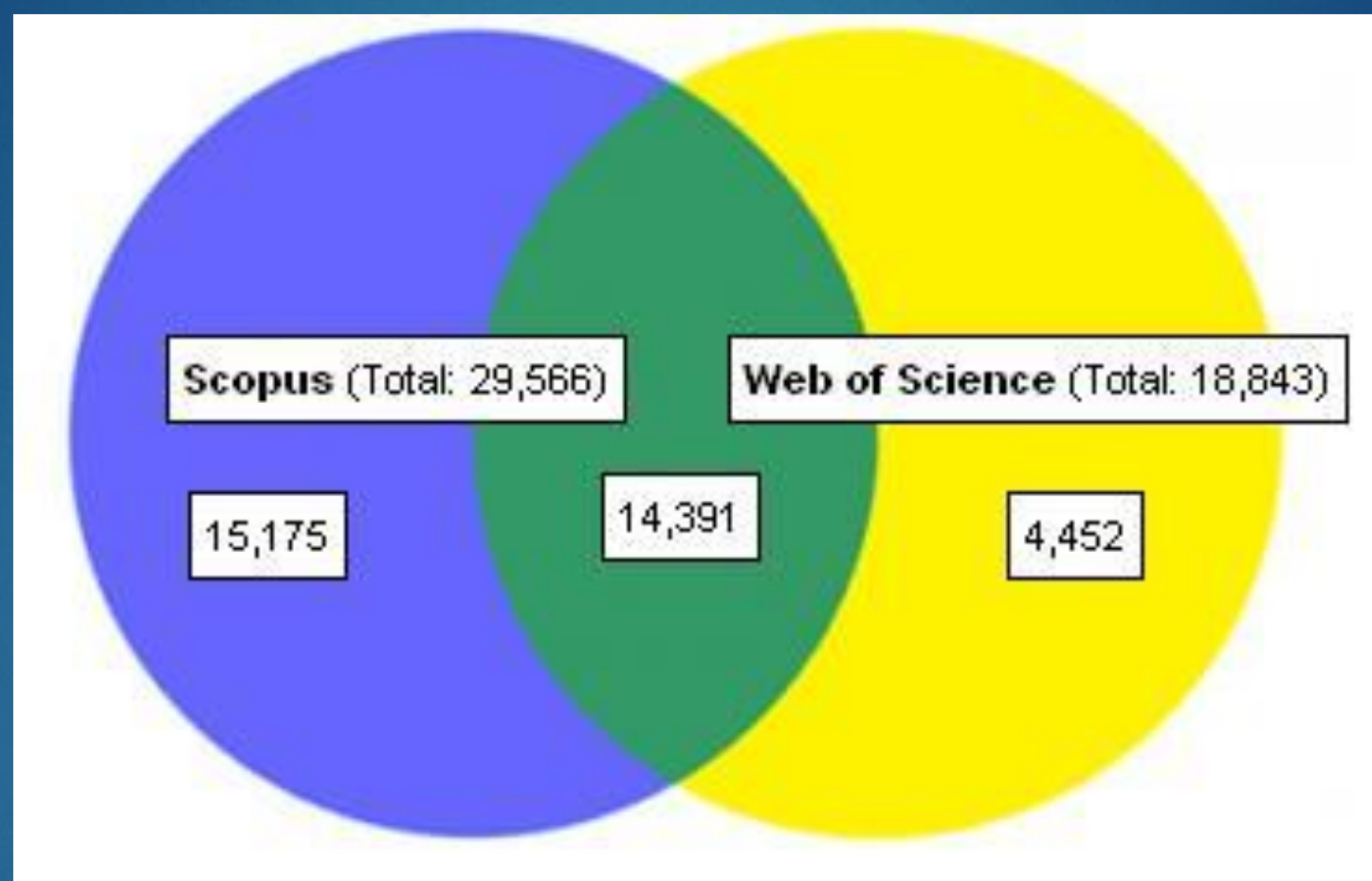
- ▶ Different versions of the same publication (pre-print, post refereed) may exist.
- ▶ Difficult to distinguish between authors with similar or identical names.
- ▶ **Unknown**: source publication title, years covered, update frequency.
- ▶ May include some non-scholarly materials such as student handbooks, library guides or editorial notes.

# Scopus

26

- ▶ Provides a **Citation Tracker** feature that allows for generation of a Citation Overview chart to generate an h index for publications and citations.
- ▶ Does not have complete citation information for articles published before 1996.
- ▶ Allows for removal of self-citations from the overall citation counts.
  - ▶ <https://www.scopus.com/search/form.uri?display=authorLookup>





## Brief Summary of WoS, Scopus, GS

Web of Science (1991-)	Scopus	Google Scholar
<b>Best coverage of older publications/citations</b>	References only available from 1996 -	Weak at older publications
Expensive subscription	Expensive subscription	Free
Peer review publications	Peer review publications	Authority of source publications ??
Poor coverage of non-journal literature	Better coverage of conference papers than WoS	<b>Better coverage of non-journal literature:</b> conference publications, book chapters/series, etc.
Good record structure and data analysis features	Good record structure and data analysis features	No control on record structure, lack of advanced search/analysis features
<b>Science &amp; technology literature dominance</b>	<b>Science &amp; technology literature dominance</b>	Better coverage of humanities, social science & business literature

The degree of correlation between results in Google Scholar and other databases differs somewhat from one field to another.

# Other Databases

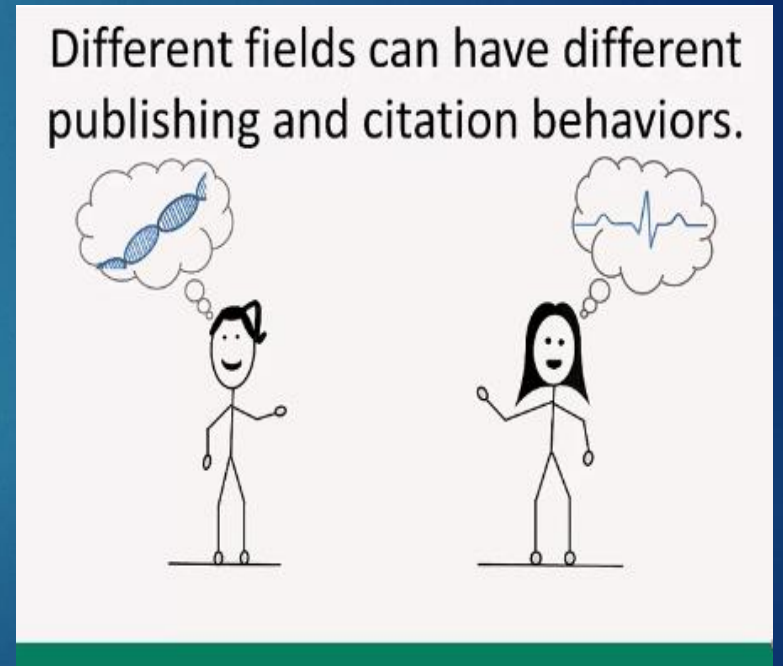
29

- ▶ Publish or Perish (no GS profile)  
<https://harzing.com/resources/publish-or-perish#download>
- ▶ Semantic Scholar
  - ▶ <https://www.semanticscholar.org/>
- ▶ Scholarometer  
<http://scholarometer.indiana.edu/>
- ▶ Microsoft Academic Search  
<https://academic.microsoft.com/>
- ▶ Experts ranked by h-index  
<http://www.arnetminer.org/ranks/experts>
- ▶ iCite  
<https://icite.od.nih.gov/analysis>

# Disciplinary publication cultures

30

- ▶ Not fair to compare scholars across disciplines. They differ in:
- ▶ Number of researchers.
- ▶ **Research volume.**
- ▶ **Citation frequencies,**
- ▶ Number of references in a paper.
- ▶ **Number of co-authors,**
- ▶ **Collaborate** at different levels and
- ▶ **Publication types:** (**books**, monographs, and journals, conference).
- ▶ only the most productive scholars in humanities publish on a monthly basis, rarely with more than one or two authors.
- ▶ In biological sciences, this level of productivity and multiple authors is quite common.



# Disciplinary publication cultures

31

- ▶ Therefore:
  - ▶ Number of articles published in peer-reviewed journals,
  - ▶ Citation rate of published articles,
  - ▶ Number of authors per paper differ.
- ▶ **Field normalization** can be achieved either by:
  - ▶ Compare within a single discipline. or
  - ▶ Accurately measuring publication culture and then comparing each researcher against the standards of their own discipline.

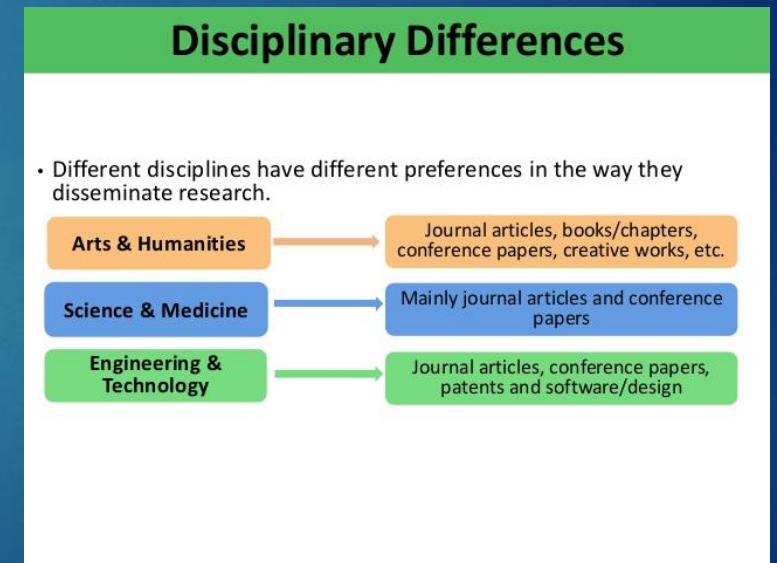
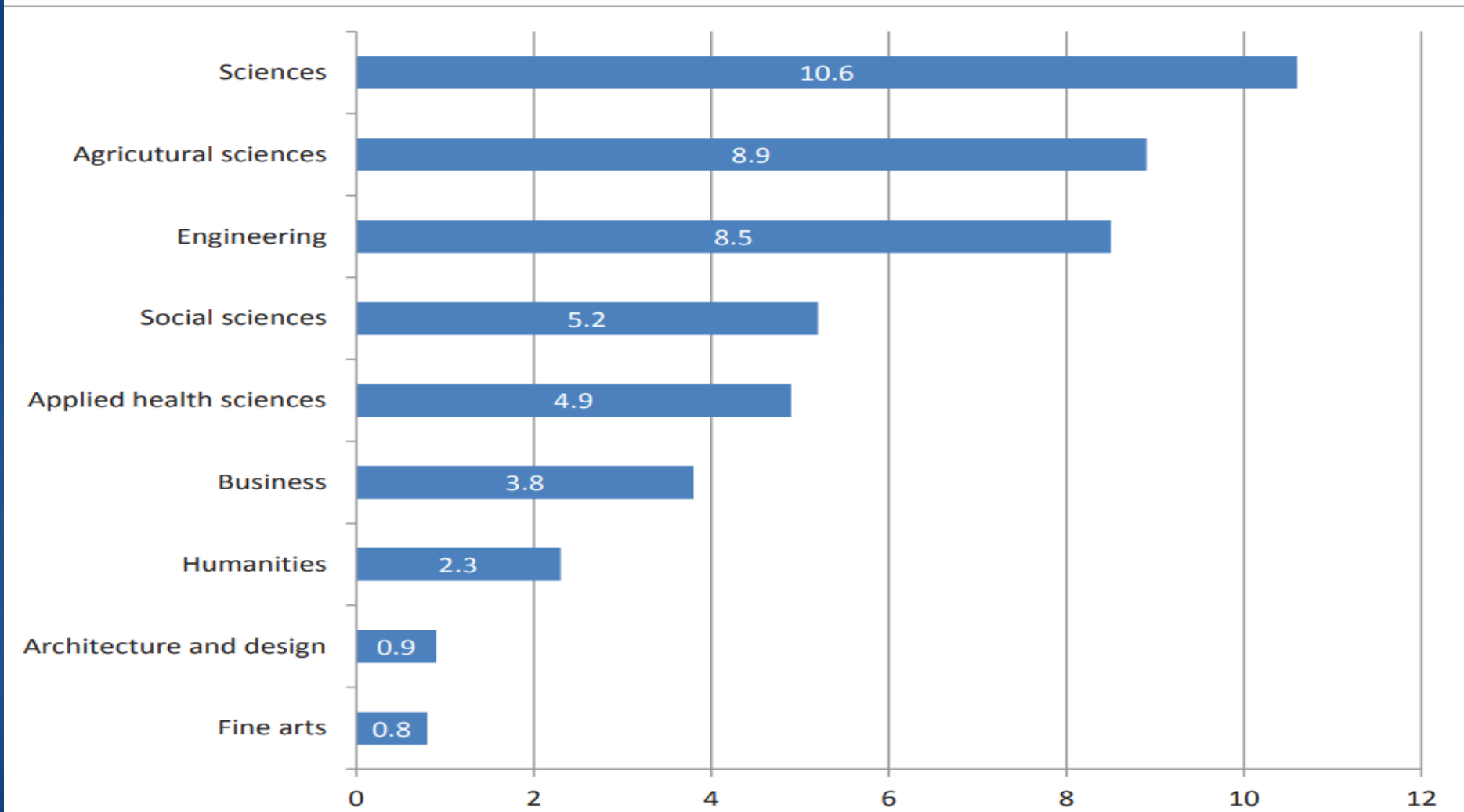














































Figure 1: Mean H-index Scores by Field of Study



### Field Rankings

Sorted by: Citations Papers Citations per Paper Field					
	View	Field	Papers	Citations	Citations Per Paper
1	 	CLINICAL MEDICINE	1,995,568	24,866,973	12.46
2	 	CHEMISTRY	1,133,413	12,171,114	10.74
3	 	BIOLOGY & BIOCHEMISTRY	541,739	9,032,360	16.67
4	 	PHYSICS	839,235	7,333,608	8.74
5	 	MOLECULAR BIOLOGY & GENETICS	267,030	6,645,088	24.89
6	 	NEUROSCIENCE & BEHAVIOR	288,582	5,410,498	18.75
7	 	PLANT & ANIMAL SCIENCE	529,947	3,929,208	7.41
8	 	ENGINEERING	769,035	3,478,532	4.52
9	 	MATERIALS SCIENCE	434,748	2,891,143	6.65
10	 	ENVIRONMENT/ECOLOGY	251,265	2,714,763	10.80
11	 	IMMUNOLOGY	119,728	2,530,119	21.13
12	 	PSYCHIATRY/PSYCHOLOGY	233,979	2,496,896	10.67
13	 	GEOSCIENCES	264,354	2,448,694	9.26
14	 	MICROBIOLOGY	156,871	2,400,135	15.30
15	 	PHARMACOLOGY & TOXICOLOGY	175,162	2,065,942	11.79
16	 	SOCIAL SCIENCES, GENERAL	422,893	1,880,310	4.45
17	 	SPACE SCIENCE	118,829	1,637,969	13.78
18	 	AGRICULTURAL SCIENCES	190,980	1,286,794	6.74
19	 	ECONOMICS & BUSINESS	156,074	907,805	5.82
20	 	COMPUTER SCIENCE	252,208	889,290	3.53
21	 	MATHEMATICS	247,568	821,677	3.32
22	 	MULTIDISCIPLINARY	18,713	93,164	4.98

# Engineering

34

Table 4: Mean H-index by Discipline: Engineering

Discipline	Mean H-index
Biological engineering	13.4
Chemical engineering	9.7
Civic engineering	4.5
Computer science, computer engineering, and electrical engineering	10.3
Materials engineering	9.2
Mechanical engineering	6.1
<b>All engineering sciences</b>	<b>8.5</b>

# Social Sciences

35

Discipline	index
Aboriginal studies	2.0
Anthropology	4.6
Criminology	3.2
Culture and communications	2.2
Economics	6.0
Gender and women's studies	4.6
Geography	5.1
Law	2.8
Linguistics	5.6
Political science /public policy	5.0
Psychology	9.6
Religious studies	2.8
Social work	3.7
Sociology	5.2
<b>All social sciences</b>	<b>5.2</b>

# Sciences

36

Table 2: Mean H-index by Discipline: Sciences

Discipline	Mean H-index
Astronomy/astrophysics	20.3
Biology	13.4
Chemistry/biochemistry	11.9
Environmental Science	6.7
Geology and Earth Sciences	9.5
Math/Stats	6.6
Natural resource management & forestry	9.1
Neuroscience	11.3
Physics	12.4
<b>All sciences</b>	<b>10.6</b>

# How to increase your citation counts?

37

## 1. Work in a sub-field that is growing.

it is not important that the sub-field be big; it must just be growing



© Leigh Hilbert Photography

# How to increase your citation counts?

38

2. Publish something worth citing!

# How to increase your citation counts?

39

3. Publish as much as possible!

# How to increase your citation counts?

4. Produce a piece of well written, top quality, original research.

<https://terrytao.wordpress.com/advice-on-writing-papers/>

# How to increase your citation counts?

## 5. Choosing a journal

- Topic-specific journals/published by a specialized society.
- High impact factor:
  - ▶ <http://jcr.incites.thomsonreuters.com/JCRJournalHomeAction.action>
  - ▶ <https://www.scopus.com/sources.uri?zone=TopNavBar&origin=searchbasic>
- Highest number of abstracting and indexing
  - ▶ <http://ulrichsweb.serialssolutions.com/title/685895>

# How to increase your citation counts?

42

6. Make your publication visible:

# Use a consistent form of your name

43

## ► **Tips:**

- Do author search in PubMed, Scopus or Web of Science
- If common,
  - Consider adding your full middle name or using your middle initial
  - Research identifier, such as an ORCID, ResearcherID, SCOPUS, Google Scholar
- <https://orcid.org/>
- <http://www.researcherid.com/SelfRegistration.action>
- SCOPUS

# Your affiliation

44

## ► **Tips:**

- Use a standardized institutional affiliation and address, using no abbreviations.
- Check the final proofs of your work to ensure your name and affiliation are shown correctly.

# Your Title

45

## ► **Tips:**

- Get the title right.
- Formulate a concise, well-constructed title.
- Create a search engine friendly title
- Use your keywords and phrases in your title (1-2 keywords related to your topic).
- A declarative title is recommended.
- Keep your title short.

# Your Abstract

46

- ▶ Researchers will rarely investigate beyond the first 20 results from Google.
- ▶ **Tips:**
  - ▶ Formulate a concise, well-constructed abstract.
  - ▶ Place essential findings and keywords in the first two sentences of your abstract.
  - ▶ Repeat your keywords 3-6 times.

# Your Keywords

47

## ► **Tips:**

- Choose your key words carefully.
- Consider current "buzzwords".
- Find specific keywords on Google Trends and Google Adwords keyword tools
  - <https://trends.google.com/trends/>
  - <https://adwords.google.com/home/tools/keyword-planner/>

# Example of an article optimized for search engines

48

- ▶ This article comes out top in Google Scholar on a search of 'depression folic acid'. These are words that researchers are likely to search on. These search terms are highlighted below so you can see the patterns of repeated phrases that Google looks at.
- ▶ **Treatment of depression: time to consider folic acid and vitamin B12**
- ▶ We review the findings in major **depression:** of a low plasma and particularly red cell folate, but also of low vitamin B12 status. Both low folate and low vitamin B12 status have been found in studies of **depression:** patients, and an association between **depression:** and low levels of the two vitamins is found in studies of the general population. Low plasma or serum folate has also been found in patients with recurrent mood disorders treated by lithium. A link between **depression:** and low folate has similarly been found in patients with alcoholism. It is interesting to note that Hong Kong and Taiwan populations with traditional Chinese diets (rich in folate), including patients with major **depression:**, have high serum folate concentrations. However, these countries have very low life time rates of major **depression:**. Low folate levels are furthermore linked to a poor response to antidepressants, and treatment with **folic acid** is shown to improve response to antidepressants. A recent study also suggests that high vitamin B12 status may be associated with better treatment outcome. Folate and vitamin B12 are major determinants of one-carbon metabolism, in which S-adenosylmethionine (SAM) is formed. SAM donates methyl groups that are crucial for neurological function. Increased plasma homocysteine is a functional marker of both folate and vitamin B12 deficiency. Increased homocysteine levels are found in depressive patients. In a large population study from Norway increased plasma homocysteine was associated with increased risk of **depression:** but not anxiety. There is now substantial evidence of a common decrease in serum/red blood cell folate, serum vitamin B12 and an increase in plasma homocysteine in **depression:**. Furthermore, the MTHFR C677T polymorphism that impairs the homocysteine metabolism is shown to be overrepresented among depressive patients, which strengthens the association. On the basis of current data, we suggest that oral doses of both **folic acid** (800 µg daily) and vitamin B12 (1 mg daily) should be tried to improve treatment outcome in depression.
- ▶ **Key Words: cobalamin • depression: • diet • folate • folic acid • homocysteine • one carbon-metabolism • S-adenosylmethionine • vitamin B12**
  - ▶ **Key points to note:**
  - ▶ Clear and descriptive title including main key terms or phrases.
  - ▶ Abstract repeats key phrases in a contextually natural way.
  - ▶ Key terms or phrases repeated in keywords field.
  - ▶ Many other factors influence ranking but this content is written in a way that gives it the best chance

# Example of an article that has not been optimized

49

- ▶ This article could not be found in Google Scholar after searching on a variety of phrases around the subject of the article, the representation of **youth anti-war protests**. The words highlighted below are the only terms repeated and these are unlikely to help someone researching this subject find this article via Google.
- ▶ **Peace Children**
- ▶ Debate over the role that young people should play in politics reflects different conceptions of childhood and adult concerns about loss of authority and political hegemony. Coverage of demonstrations against the Second Iraq War by the British national press echoes adult discourse on the nature of childhood and exposes the limits set on political activity. Analysis of news-text and images reveals concerns about the political competence of youth, their susceptibility to manipulation and the requirement for social control. Approval of youth's right to protest was often conditional on the cause espoused.
- ▶ **Key Words:** childhood • Second Iraq War
  - ▶ **Key points to note:**
  - ▶ The title is meaningless outside the context of the printed journal issue. It might appeal to people but it does not appeal to online search engines.
  - ▶ Title does not include key terms or phrases e.g. 'youth anti-war protests'
  - ▶ Abstract does not repeat key phrases used within title or article and presents Google with no patterns to look at.
  - ▶ Only two keywords are provided and the article's key phrases are not listed.

# Your Language

50

- ▶ **Tips:**

- ▶ English.
- ▶ Team.
- ▶ Proofreading services.

# Write with one or more co-authors

51

- ▶ **Tips:**

- ▶ Multiple opportunities for promoting the work.
- ▶ They are more likely to cite the work.
- ▶ Team-authored articles get cited more.
- ▶ Typically high cited articles are authored by a large number of scientists.
- ▶ A high profile co-author.
- ▶ International co-author (**cited up to four times more**).
- ▶ Articles published with multi-countries or multi-institutes collaborations get cited more.

# Cite your past work

52

## ► **Tips:**

- When it is relevant.
- Limit self-citation to a maximum of 3 references and only include journal papers.
- Team-authored articles get cited more.
- Typically high cited articles are authored by a large number of scientists.
- A high profile co-author
- International co-author.

# Cite colleagues at your department

53

- ▶ **Tips:**

- ▶ They are likely to cite you back.
- ▶ “self-citation”, it still makes your work more visible and therefore more likely to be cited by others.

# OA journal

54

## ► **Tips:**

- More audience and higher citations.
- Freely accessible articles increase citations by 50% or more.
- Submit your paper to an OA journal if high quality.
- A paid open access option.

# Open Repositories

55

- ▶ A publicly-accessible Internet site that provides a no cost version of the finalized text, images, and tables of published journal papers from individuals affiliated with the hosting body.
- ▶ Copyright issues.
- ▶ **Tips:**
  - ▶ Pre- or post-publication prints.
  - ▶ Enforced waiting period of 12-24 months.
    - ▶ <http://www.sherpa.ac.uk/romeo/search.php>
  - ▶ ResearchGate
    - ▶ (<http://www.researchgate.net>).
  - ▶ Many copies of your articles available online and links.

# Use more references

56

- ▶ **Tips:**

- ▶ Higher number higher citations.
- ▶ More connected and chance to cite your work.
- ▶ Chance to do collaborative work.

# Contribute to Wikipedia

57

- ▶ **Tips:**

- ▶ A paper used as a reference in Wikipedia receives significant citations.

# Sharing detailed research data

58

- ▶ **Tips:**

- ▶ Open data (Publicly-available datasets) are significantly associated with a 69% increase in citations to articles that accompany the data.

# Publish across disciplines

59

- ▶ **Tips:**

- ▶ Collaborate with authors and researchers from other subject areas.
- ▶ Publishing across disciplines has been found to increase citation e.g. chemistry, biological science and physics.

# Review papers

60

- ▶ **Tips:**

- ▶ Review papers typically attract more citations than other types of paper.
- ▶ Editorials, letters to editors, news items, meeting abstracts, and case studies are generally poorly cited
- ▶ .

# Self-promotion

61

## ► Tips:

- Present your work at conferences.
- When you review articles for journals, recommending authors to cite your own work.
- Create a blog or a website dedicated to your research.
  - [ResearchBlogging.org](http://ResearchBlogging.org)
  - See "[How to Write a Blogpost From Your Journal Article](#)."
- Podcast/or video of your research and submit to **YouTube**. YouTube channels
- Social media (Facebook, Twitter, Academia.edu, Zendodo, Mendeley, Citeulike, LinkedIn). Links to your papers on your university profile page.
- Email copies of your paper to researchers who may be interested.
- Conduct outreach visits or provide seminars to other institutions.
- Link your latest published article to your email signature.

# The importance of search engines

62

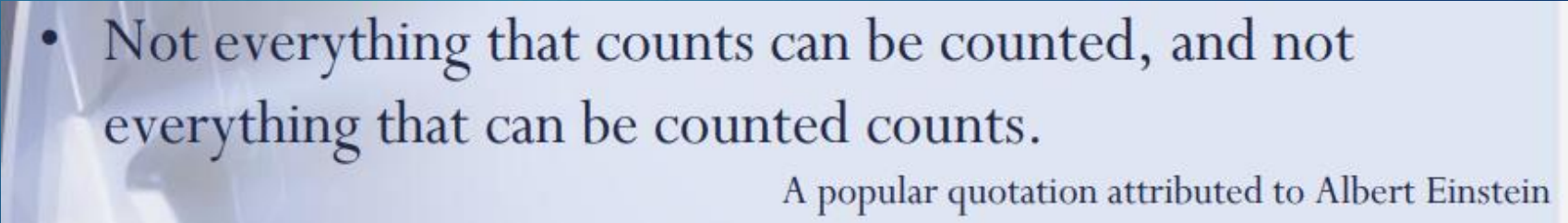
- There are over 100 factors that a search engine will look at before deciding how to rank your article in their search results, but the starting point is the content that you write:

<ul style="list-style-type: none"><li>• the volume of incoming links from related websites</li><li>• time within website</li><li>• page titles</li><li>• quality of content</li><li>• relevance</li><li>• page descriptions</li><li>• quantity of content</li><li>• technical precision of source code</li><li>• functional vs broken hyperlinks</li></ul>	<ul style="list-style-type: none"><li>• volume and consistency of searches</li><li>• spelling</li><li>• page views</li><li>• revisits</li><li>• click-throughs</li><li>• technical user-features</li><li>• uniqueness</li><li>• keywords</li></ul>
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# Why citation counts can't always be trusted

63

- ▶ Editors and publishers:
- ▶ In one case, merely calling for a paper to be cited in its text (“This paper could serve as a general literature citation . . .”) led to more than 6,600 citations and increased the impact factor of *Acta Crystallographica Section A* from 2.051 to 49.926. Its next-most cited article had 28 citations.
- ▶ **Negative citation** – an incorrect or controversial paper may attract as many citations as a highly respected paper (widespread criticism).
- ▶ Citation ‘circles’
- ▶ **Total impact???**



- Not everything that counts can be counted, and not everything that can be counted counts.

A popular quotation attributed to Albert Einstein

# Alternatives

64

- ▶ <https://profiles.impactstory.org/>
- ▶ <https://www.altmetric.com/>
- ▶ [https://plu.mx/sign\\_in](https://plu.mx/sign_in)
- ▶ <https://badge.dimensions.ai/>



# Altmetric